

Solitary Kidney

National Kidney and Urologic Diseases Information Clearinghouse



National
Institute of
Diabetes and
Digestive
and Kidney
Diseases

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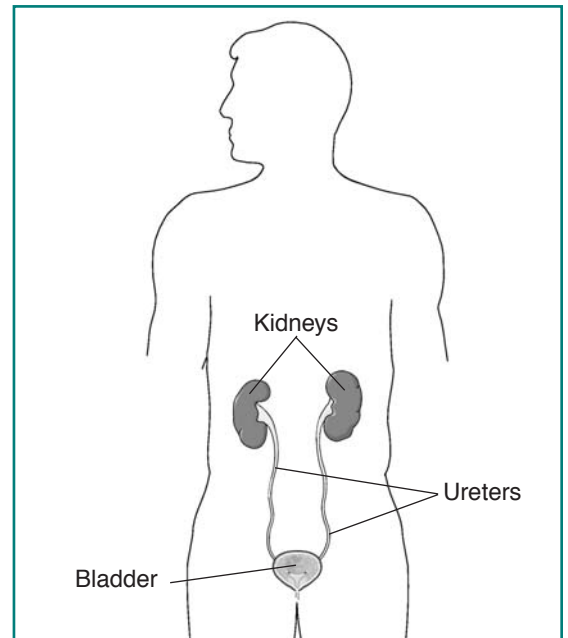
Your kidneys perform many functions to keep you alive. They

- filter wastes and extra fluid from your blood
- keep the proper balance of minerals like sodium, phosphorus, calcium, and potassium in your blood
- help maintain a healthy blood pressure
- make hormones that keep your blood and bones healthy

Most people have two kidneys, one on each side of the spinal column in the back just below the rib cage. Each kidney is about the size of a fist and contains about 1 million nephrons. The nephrons are microscopic filtering “baskets” that transfer wastes from the blood to the collecting tubules of the urinary system.

A person may have only one kidney for one of three main reasons.

- A person may be born with only one kidney, a condition known as renal agenesis. Many people with this condition lead normal, healthy lives and only discover that they have one kidney when they have an x ray or sonogram or surgery for some unrelated condition.
- Some people must have one kidney removed to treat cancer or other diseases or injuries. The operation to remove a kidney is called a nephrectomy.
- A growing number of people are donating a kidney to be transplanted into a family member or friend whose kidneys have failed.



The kidneys remove wastes and extra water from the blood to form urine. Urine flows from the kidneys to the bladder through the ureters.

Most people can live a normal, healthy life with one kidney. Taking precautions is wise to protect the kidney function you do have.

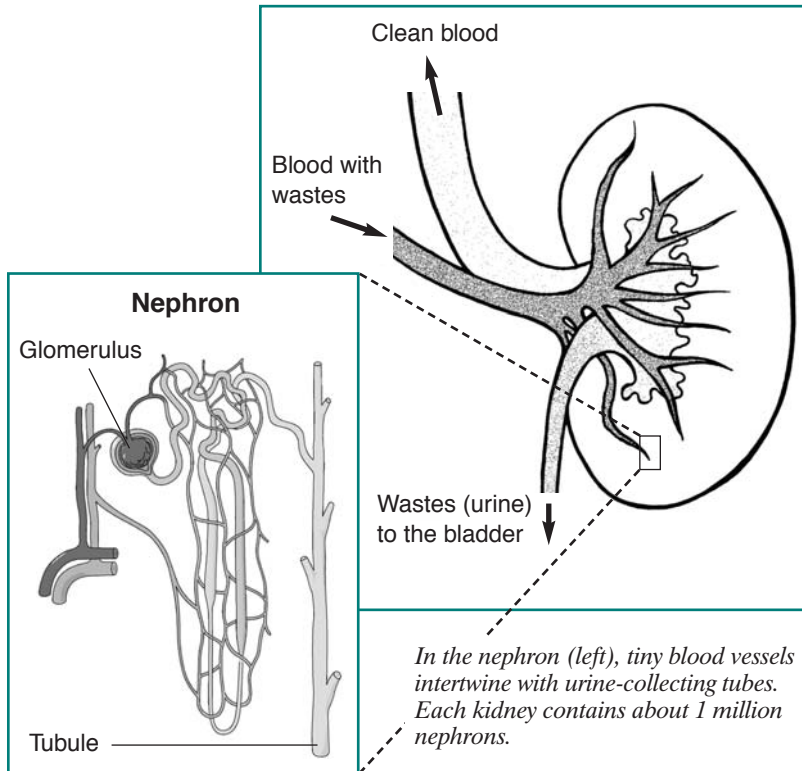
What are the possible effects of solitary kidney?

If having a single kidney does affect your health, the changes are likely to be so small and happen so slowly that you won't notice them. Over long periods of time, however, these gradual changes may require specific measures or treatments. Changes that may result from a single kidney include the following:

- **High blood pressure.** Kidneys help maintain a healthy blood pressure



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by regulating how much fluid flows through the bloodstream and by making a hormone called renin that works with other hormones to expand or contract blood vessels. Many people who lose or donate a kidney are found to have slightly higher blood pressure after several years.

- **Proteinuria.** Excessive protein in the urine, a condition known as proteinuria, can be a sign of kidney damage. People are often found to have higher-than-normal levels of protein in their urine after they have lived with one kidney for several years.
- **Reduced GFR.** The glomerular filtration rate (GFR) shows how efficiently your kidneys are removing wastes from your bloodstream. People have a reduced GFR if they have only one kidney.
- Normal blood pressure is considered to be 120/80 or lower. You have high blood pressure if it is over 140/90. People with kidney disease or one kidney should keep their blood pressure below 130/80. Controlling blood pressure is especially important because high blood pressure can damage kidneys.
- Your doctor may use a strip of special paper dipped into a little cup of your urine to test for protein. The color of the “dipstick” indicates the presence or absence of protein. A more sensitive test for proteinuria involves laboratory measurement and calculation of the protein-to-creatinine ratio. A high protein-to-creatinine ratio in urine (greater than 30 milligrams of albumin per 1 gram of creatinine) shows that kidneys are leaking protein that should be kept in the blood.
- Measuring GFR used to require an injection of a contrast medium like iothalamate into the bloodstream followed by a 24-hour urine collection to see how much of the medium is filtered through the kidneys in that time.

You can have high blood pressure, proteinuria, and reduced GFR and still feel fine. As long as these conditions are under control, they will probably not affect your health or longevity. Schedule regular checkups with your doctor to monitor these conditions.

How can you protect your kidneys?

Monitoring

Your doctor should monitor your kidney function by checking your blood pressure and testing your urine and blood once a year.

In recent years, however, scientists have discovered that they can estimate a person's GFR based on the amount of creatinine in a small blood sample. The new GFR calculation uses the patient's creatinine measurement along with weight, age, and values assigned for sex and race. Some medical laboratories may calculate GFR at the same time they measure and report creatinine values. If your GFR stays consistently below 60, you are considered to have chronic kidney disease.

Controlling Blood Pressure

If your blood pressure is above normal, you should work with your doctor to keep it below 130/80. Great care should be taken in selecting blood pressure medicines for people with a solitary kidney. Angiotensin-converting enzyme (ACE) inhibitors and angiotensin receptor blockers (ARBs) are two classes of blood pressure medicine that protect kidney function and reduce proteinuria. But these medicines may be harmful to someone with renal artery stenosis (RAS), which is the hardening of the arteries that enter the kidneys. Diuretics can help control blood pressure by removing excess fluid in the body. Controlling your blood pressure may require a combination of two or more medicines, plus changes in diet and activity level.

Eating Sensibly

Having a single kidney does not mean that you have to follow a special diet. You simply need to make healthy choices, including fruits, vegetables, grains, and low-fat dairy foods. Limit your daily salt (sodium) intake to 2,000 milligrams or less if you already have high blood pressure. Reading nutrition labels on packaged foods to learn how much sodium is in one serving and keeping a sodium diary can help. Limit alcohol and caffeine intake as well.

Avoid high-protein diets. Protein breaks down into the waste materials that the kidneys must remove, so excessive protein puts an extra burden on the kidneys. Eating moderate amounts of protein is still important for proper nutrition. A dietitian can help you find the right amount of protein in your diet.

Avoiding Injury

Some doctors may advise patients with a solitary kidney to avoid contact sports like boxing, football, and hockey. One study indicated that motor vehicle collisions and bike riding accidents were more likely than sports injuries to seriously damage the kidneys. In recent years, athletes with a single working kidney have participated in sports competition at the highest levels. Having a solitary kidney should not automatically disqualify you from sports participation. Children should be encouraged to engage in some form of physical activity, even if contact sports are ruled out. Protective gear such as padded vests worn under a uniform can make limited contact sports like basketball or soccer safe. Doctors, parents, and patients should consider the risks of any activity and decide whether the benefits outweigh those risks.

Hope Through Research

In recent years, researchers have learned much about kidney disease. The National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) sponsors several programs aimed at understanding kidney failure and finding treatments to stop its progression. NIDDK's Division of Kidney, Urologic, and Hematologic Diseases supports basic research into normal kidney development in the embryo and the genetic causes of birth defects that may result in a solitary kidney. New imaging techniques can help to diagnose solitary kidney before birth.

For More Information

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Life Options Rehabilitation Resource Center

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The National Kidney and Urologic Diseases Information Clearinghouse (NKUDIC) is a service of the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). The NIDDK is part of the National Institutes of Health under the U.S. Department of Health and Human Services. Established in 1987, the clearinghouse provides information about diseases of the kidneys and urologic system to people with kidney and urologic disorders and to their families, health care professionals, and the public. NKUDIC answers inquiries, develops and distributes publications, and works closely with professional and patient organizations and Government agencies to coordinate resources about kidney and urologic diseases.

Publications produced by the clearinghouse are carefully reviewed by both NIDDK scientists and outside experts. This fact sheet was reviewed by Akinlolu Ojo, M.D., Ph.D., University of Michigan.

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This fact sheet is also available at
www.kidney.niddk.nih.gov.



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